Docket No.: 1163-0536PUS1
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Masashi TAMURA et al.

Application No.: 10/553,424 Confirmation No.: 1484

Filed: October 18, 2005 Art Unit: 2624

For: IMAGE PROCESSING METHOD Examiner: Michael A. NEWMAN

APPEAL BRIEF

MS Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

As required under § 41.37(a), this brief is being filed in furtherance of said Notice of Appeal filed in this case on September 23, 2008 with a one (1) month extension of time as per § 41.31(d).

The fees required under § 41.20(b)(2) are dealt with in the accompanying TRANSMITTAL OF APPEAL BRIEF.

This brief contains items under the following headings as required by 37 C.F.R. § 41.37 and M.P.E.P. § 1206:

I.	Real Party In Interest
II	Related Appeals and Interferences
III.	Status of Claims
IV.	Status of Amendments
V.	Summary of Claimed Subject Matter

VI. Grounds of Rejection to be Reviewed on Appeal
VII. Argument
VIII. Claims
IX. Evidence
X. Related Proceedings
Appendix A Claims
Evidence Appendix
Related Proceedings Appendix

I. REAL PARTY IN INTEREST

The real party in interest for this appeal is:

MITSUBISHI DENKI KABUSHIKI KAISHA

Tokyo, Japan

II. RELATED APPEALS, INTERFERENCES, AND JUDICIAL PROCEEDINGS

There are no other appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

III. STATUS OF CLAIMS

A. Total Number of Claims in Application

There are 9 claims pending in the application.

B. Current Status of Claims

1. Claims canceled: none

2. Claims withdrawn from consideration but not canceled: none

3. Claims pending: 1-9

4. Claims allowed: 1 – 4, 8

5. Claims rejected: 5 – 7, 9

C. Claims On Appeal

The claims on appeal are claims 5, 6, 7 and 9. Of the appealed claims, claim 5 is independent.

Appellants note that in the interview summary issued on November 26, 2008, the Examiner stated that all claims with the exception of claims 5 – 7 and 9 are in condition for allowance. Appellants therefore only wish to appeal the rejection of claims 5 – 7 and 9.

IV. STATUS OF AMENDMENTS

Appellant filed an After Final Response on June 19, 2008 in response to the Final Office Action of March 24, 2008. The above-noted response did not contain claim amendments, therefore the claims on appeal are the same ones that were pending as of the Final Office Action of March 24, 2008.

V. SUMMARY OF CLAIMED SUBJECT MATTER

Before turning to the required summary of the independent claims, a general summary of the inventive concepts is first presented.

General Summary of Invention

An embodiment of the present invention pertains to an image processing method that includes an edge intensity value calculation step (4) that involves calculating an edge intensity value (ST3, ST4) in the neighborhood of a pixel of interest (g) (Page 8, lines 4 – 10) from the feature values of micro regions (ST1), the feature values of the micro regions being calculated by a feature value calculation step (3) (Page 7, lines 25 – 28). An embodiment of the inventive method may also entail a filter value calculation step (6) where a low-pass filter value of the pixel of interest (g) is calculated (ST4) from image signal values of neighboring pixels (G) which have a same color component as the pixel of interest (g) (Page 8, lines 11 – 14). Embodiments of the inventive method may also correct the image signal value of the pixel of interest (5, 7, ST5) by using the edge intensity value calculated by the edge intensity value calculation step (4) and the low-pass filter value calculated by the filter value calculation step (6) (Page 8, lines 15 – 21). Embodiments of image correction methods according to the invention offer advantages in preventing noise superimposed on the pixel of interest diffusing to neighboring pixels, and also in overall noise reduction.

Claim 5

Claim 5 recites an image processing method including a feature value calculation step (3) of calculating feature values of micro regions (ST1) in a specified region having a pixel of interest at a center (Fig. 7), from pickup results of an image pickup device that has a color filter with a particular color at each of pixels arrayed two-dimensionally (Fig. 3) (see also Page 11, lines 1 – 26).

Claim 5 further recites a binarization step (11) of binarizing the feature values of the micro regions calculated by the feature value calculation step (3) and a contour detection step (12) of detecting a contour using the feature values binarized by the binarization step (11) (see also Page 25, line 25 – Page 26, line 2).

Lastly, Claim 5 recites an image signal value correction step (13) of correcting an image signal value of the pixel of interest using image signal values of a plurality of pixels including the pixel of interest in a same direction as the contour detected by the contour detection step (see also Page 26, lines 3 – 7).

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

A. Whether independent claim 5 is unpatentable under 35 U.S.C §103(a) over U.S. Patent 5,200,841 to Kotaki et al. (hereafter "Kotaki") in view of U.S. Patent 7,023,487 to Adams (hereafter "Adams").

VII. ARGUMENT

Review of Prior Art

Kotaki teaches a binarizing apparatus which can smooth edges in binarized images and can accurately binarize fine shading differences and light edges. (Col. 1, lines 42-56). Specifically, Kotaki teaches a binarizing circuit with an adaptive threshold (Fig. 1, item 11) where "the mean value of the data items of the surrounding pixels calculated by the mean value circuit is fed to a threshold circuit in order to determine a threshold for binarization." (Col. 10, lines 46-67).

Either the mean value or the threshold calculated in Kotaki may be viewed as a calculated feature value. Neither of these feature values, however, is taught as being binarized in Kotaki. Kotaki uses the calculated feature values to binarize the pixel value of a pixel of interest, and does not perform any binarization on the calculated feature values themselves. Detailed arguments follow.

Rejection under 35 U.S.C. §103(a) – Kotaki – Claim 5

Independent claim 5 pertains to an image processing method comprising, in part, "a feature value calculation step of calculating feature values of micro regions in a specified region having a pixel of interest at a center," and "a binarization step of binarizing the feature values of the micro regions calculated by the feature value calculation step."

Either the mean value or the threshold calculated in Kotaki may be viewed as a calculated feature value. Neither of these feature values, however, is binarized in Kotaki as required by

independent claim 5, which requires, in part, "binarizing the feature values of the micro regions calculated by the feature value calculation step." Kotaki uses the calculated feature values to binarize the pixel value of a pixel of interest, and does not perform any binarization on the calculated feature values themselves.

Appellants spoke with the Examiner on Thursday, April 17, 2008 regarding the teachings of the Kotaki reference in light of the Atkinson definition (U.S. Patent 6,961,476 to Atkinson; see Office Action of March 24, 2008, Page 3 – The Examiner claims to merely rely on Atkinson for a definition of a term but does not use it as a prior art reference in making a rejection). As a result of the discussion, the Examiner stated that he agrees in principle that Kotaki does not teach binarizing an image feature value as required by independent claim 5 because Kotaki does not teach binarizing calculated feature values of the type defined either by Appellants' specification or by Atkinson.

"Where an explicit definition is provided by the Appellant for a term, that definition will control interpretation of the term as it is used in the claim." (MPEP §2106.II.C). Appellants respectfully submit that since the Examiner admits that Appellants' specification defines the terms "feature value" and "calculated feature value," Appellants' definition of that term must control interpretation of the term as it is used in the claims. Appellants therefore respectfully submit that even if the Examiner relies on an external reference for a definition of the term "feature value," such a definition cannot be inconsistent with how Appellants have defined the term "feature value" in their specification. Appellants respectfully submit that the Examiner must interpret Appellants' claims in light of the definitions provided in their specification as required by MPEP §2106.

The Examiner suggests that Kotaki's division of an image into an NxN window to calculate mean and threshold values (see Kotaki at Col. 3 line 65 – Col. 4, line 12) is a feature value calculation process. Appellants agree, as stated above, that the mean and threshold values are feature values. Appellants further agree that such values are feature values of a feature within the definition given by the Examiner. Appellants do not agree, however, that the individual pixels, pixel locations or individual pixel values in Kotaki's NxN window are calculated feature values. Appelants maintain that the concept of a single pixel itself inherently being a "calculated feature value" is wholly inconsistent with the definition of a "feature value" as provided in Appellants' specification (see Appellant's Specification - Page 11, lines 1 – 26).

Furthermore, a binarized feature value is drastically different from a binarized pixel. The binarization of pixels, in an image, will inherently result in changes to some of the features of the image. These changes, however, are neither direct nor calculated. The binarization of pixels neither requires nor implies that the features comprised of those pixels, and therefore the feature values associated with those features, are also similarly binarized. There is no direct or conceptual correlation between the effects of binarization on individual pixels in an image and the effects on the values of image features composed of those pixels. Kotaki only teaches the binarization of individual pixels based on calculated feature values, and therefore makes no direct or indirect teaching of binarizing or otherwise carrying out operations on calculated feature values.

Specifically, independent claim 5 requires binarizing calculated feature values and then using those binarized feature values for contour detection. The results of the contour detection are then used to correct "an image signal value of the pixel of interest using image signal values

of a plurality of pixels including the pixel of interest in a same direction as the contour detected by the contour detection step." The process of binarizing calculated feature values to allow for adjustment of individual pixel values as claimed in independent claim 5 is therefore extremely different from the pixel binarization process taught by Kotaki, and the binarization of feature values according to independent claim 5 requires no immediate effect on the pixels comprising the image simply because a calculated feature value is binarized.

Appellants therefore respectfully submit that under any interpretation of the term "feature value" consistent with Appellants' specification, Kotaki still fails to teach "a binarization step of binarizing the feature values of the micro regions calculated by the feature value calculation step" as required by independent claim 5.

Appellants further submit that Adams is neither relied upon, nor can it properly be relied upon, to remedy the deficiencies of Kotaki in view of Atkinson's definition. Appellants therefore respectfully submit that neither Kotaki nor Adams, taken either alone or in combination (assuming the references may be combined, which Appellants do not admit) teach or suggest "a binarization step of binarizing the feature values of the micro regions calculated by the feature value calculation step" as required by independent claim 5. Accordingly, Appellants respectfully submit that the Examiner has failed to establish a *prima facie* case of obviousness with respect to independent claim 5 or any claims depending therefrom.

Dependent Claims

Dependent claims 6 and 7 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Kotaki in view of Adams. Claim 9 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Kotaki in view of Adams in further view of U.S. Patent 6,229,578 to Acharya.

It is noted that all of the above are dependent claims which are not being relied upon for patentability during this appeal.

In summary, the Examiner has made several clear errors. Appellants respectfully submit that these clear errors provide a substantial basis for reversing the Examiner and allowing this case.

VII. CLAIMS

A copy of the claims involved in the present appeal is attached hereto as Appendix A.

VIII. EVIDENCE

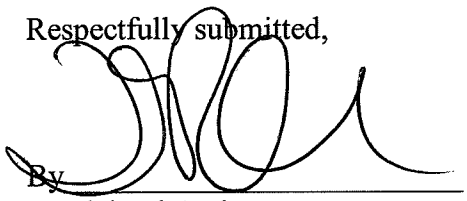
No evidence pursuant to §§ 1.130, 1.131, or 1.132 or entered by or relied upon by the examiner is being submitted.

IX. RELATED PROCEEDINGS

No related proceedings are referenced in II. above, hence copies of decisions in related proceedings are not provided.

Date: December 10, 2008

Respectfully submitted,



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APPENDIX A

Claims Involved in the Appeal of Application Serial No. 10/553,424

1. An image processing method comprising:

a feature value calculation step of calculating feature values of micro regions in a specified region having a pixel of interest at a center, from pickup results of an image pickup device that has a color filter with a particular color at each of pixels arrayed two-dimensionally;

an edge intensity value calculation step of calculating an edge intensity value in a neighborhood of the pixel of interest from the feature values of the micro regions calculated by the feature value calculation step;

a filter value calculation step of calculating a low-pass filter value of the pixel of interest from the image signal values of neighboring pixels which have a same color component as the pixel of interest; and

an image signal value correction step of correcting the image signal value of the pixel of interest by using the edge intensity value calculated by the edge intensity value calculation step and the low-pass filter value calculated by the filter value calculation step, wherein said image signal value correction is performed either before or after a color interpolation.

2. The image processing method according to claim 1, further comprising an edge intensity value correction step of correcting the edge intensity value calculated in the edge intensity value calculation step in accordance with an edge intensity correction curve, wherein the image signal value correction step corrects the image signal value of the pixel of interest by carrying out weighted addition of the image signal value of the pixel of interest and the low-pass filter value using the edge intensity values before and after the edge intensity value correction.

3. The image processing method according to claim 1, wherein the feature value calculation step, using image signal values output from R-color filter, G-color filter and B-color

filter corresponding to the micro regions in the specified region, calculates the feature values of the micro regions.

4. The image processing method according to claim 1, wherein when carrying out color interpolation of an image of the pixel of interest using pixel signal values of neighboring pixels, the feature value calculation step, the edge intensity value calculation step, the filter value calculation step and the image signal value correction step carry out the correction of the image signal value of the pixel of interest.

5. An image processing method comprising:

a feature value calculation step of calculating feature values of micro regions in a specified region having a pixel of interest at a center, from pickup results of an image pickup device that has a color filter with a particular color at each of pixels arrayed two-dimensionally;

a binarization step of binarizing the feature values of the micro regions calculated by the feature value calculation step;

a contour detection step of detecting a contour using the feature values binarized by the binarization step; and

an image signal value correction step of correcting an image signal value of the pixel of interest using image signal values of a plurality of pixels including the pixel of interest in a same direction as the contour detected by the contour detection step.

6. The image processing method according to claim 5, wherein the image signal value correction step corrects the image signal value of the pixel of interest by carrying out weighted addition of the image signal values of the plurality of pixels in the same direction as the contour.

7. The image processing method according to claim 5, wherein the contour detection step detects the contour by carrying out pattern matching of distribution of the feature values in the specified region binarized by the binarization step with preset binary distribution.

8. An image processing method comprising:

a feature value calculation step of calculating feature values of micro regions in a specified region having a pixel of interest at a center, from pickup results of an image pickup device that has a color filter with a particular color at each of pixels arrayed two-dimensionally;

a binarization step of binarizing the feature values of the micro regions calculated by the feature value calculation step;

a contour detection step of detecting a contour using the feature values binarized by the binarization step; and

a first image signal value correction step of correcting, when the contour is detected by the contour detection step, an image signal value of the pixel of interest using image signal values of a plurality of pixels including the pixel of interest in a same direction as the contour detected by the contour detection step;

an edge intensity value calculation step of calculating, when the contour is not detected by the contour detection step, an edge intensity value in a neighborhood of the pixel of interest from the feature values of the micro regions calculated by the feature value calculation step;

a filter value calculation step of calculating a low-pass filter value of the pixel of interest from the image signal values of neighboring pixels which have a same color component as the pixel of interest; and

a second image signal value correction step of correcting the image signal value of the pixel of interest by using the edge intensity value calculated by the edge intensity value calculation step and the low-pass filter value calculated by the filter value calculation step.

9. The image processing method of claim 5, said feature value calculation step further comprising calculating a low-pass filter value of the pixel of interest from image signal values of neighboring pixels which have the same color component as the pixel of interest.

EVIDENCE APPENDIX

- None -

RELATED PROCEEDINGS APPENDIX

-None -